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RESEARCH ARTICLE

New herpetological records from Cozia National Park and its surrounding areas (Vâlcea County, Romania)

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Abstract

The results of faunistic surveys upon the amphibian and reptile populations in the Cozia National Park are presented. We recorded (found) 11 amphibian species (including the hybridogenetic *Pelophylax* kl. *esculentus*) and 12 reptile species; some species (*Bufotes viridis* and *Emys orbicularis*) were found after a long lapse in scientific recording. We observe that the Cozia Massif appears to have a richer herpetofauna than that of the adjoining Narâțu and Căpățânii massifs.

Keywords

Cozia National Park, amphibians, reptiles, populations, records, distribution.

Introduction

Cozia National Park is a protected area (a National Park and a Natura 2000 SCI site – ROSCI0046) of great biological diversity, including a rich herpetofauna. The knowledge of amphibian and reptile species from Cozia Massif was previously synthetized and enriched with personal data (Iftime & Iftime 2006 – for reptiles; Iftime & Iftime 2007 – for amphibians), new and interesting data about *Vipera berus* in this area were included by Zinenko et al. (2010) in their wider-scope discussion, and Cogălniceanu et al. (2013 a, b) gave new records from this area also. More data on the Natura 2000 species *Bombina variegata* were presented by us (Iftime & Iftime

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2017). In this paper, we show the results of our fieldwork, pertaining to the distribution of other herpetofauna species in the whole Cozia National Park and its surroundings (including not only the Cozia Massif, but also the Narâțu Massif and part of the Căpățânii Massif, which are very similar in terms of geomorphology and vegetation to the Cozia Massif – see, e.g., Mâciu et al. 1982), thus attempting to enlarge the knowledge on the distribution of amphibians and reptiles in and around the protected area, which would be of use for conservation-oriented management.

Materials and methods

This paper is based upon field work performed in May 2010, September 2014, May and July 2015 and May 2016, partly within the grant PN-II-PT-PCCA-2013-4-1489, partly independently. Qualitative observations were undertaken using the active transects method (after Heyer et al. 1994, and McDiarmid 1992, in Cogălniceanu 1997), the transect being 4 m wide. The geographical coordinates for all locations were acquired by GPS.

Results

Amphibian and reptile species (other than *Bombina variegata*, for which detailed results are given in Iftime & Iftime 2017) were found in 71 points in and around

Figure 1. *Salamandra salamandra*, Valea lui Stan, photo O. Iftime.

Figure 2. *Bufotes viridis*, Stânișoara monastery, photo O. Iftime.

Figure 3. *Pelophylax ridibundus*, Pripoare-Dăngești, photo O. Iftime.

the Cozia National Park. The distribution points, with their localities (grouped by major topographic features), GPS coordinates and altitude are given in Table 1.

Discussion

We have recorded 10 amphibian species (and the hybridogenetic form *Pelophylax* kl. *esculentus*) and 12 reptile species (see Table 2 for a relation between our present findings and previous publications, revealing the persistence of populations in the area as well as some species being "re-discovered" recently or on the contrary, not found lately, even though they were mentioned by older records).

Our data contribute to the knowledge of the herpetofauna from this protected area by providing new records for numerous species, from both of the Olt River banks (i.e. from the Cozia Massif proper and the Narâțu and Căpățânii massifs). The herpetofauna is very similar across all this area. However, we might notice that, while we have found new records for *Darevskia* (*praticola*) *pontica* in the Cozia Massif, this species is yet to be found on the western bank, in either the Narâțu or the Căpățânii mountains. Newt species were also only found in the Cozia Massif, probably because adequate habitat (ponds for reproduction) is far scarcer in the Narâțu and Căpățânii mountains.

Figure 4. *Pelophylax lessonae*, Pripoare-Dăngești, photo Al. Iftime.

Table 1. Locations investigated with their geographical coordinates and associated species records

Locality	GPS coordinates and altitude	Species found
Valea lui Stan	N45 20.100 E24 11.836 354 m	*Bufo bufo*, *Lacerta agilis, Podarcis muralis*, *Natrix natrix*
	N45 20.227 E24 11.796 431 m	*Rana temporaria, Natrix natrix,*
	N45 20.895 E24 11.401 369 m	*Anguis fragilis*
	N45 20.278 E24 11.795 417 m	*Salamandra salamandra*
Lotrişor-Narâţu	N45 18.227 E24 16.970 271 m	*Pelophylax ridibundus, Lacerta viridis, Podarcis muralis, Anguis fragilis, Natrix tessellata*
	N45 17.277 E24 14.140 661 m	*Bufo bufo. Vipera ammodytes* was also found around this location (2019, dr. Cristina Constantinescu, pers. comm).
	N45 17.566 E24 14.625 619 m	*Rana temporaria, Lacerta agilis* f. *erythronotus*
	N45 17.190 E24 14.102 689 m	*Salamandra salamandra, Bufo bufo, Rana temporaria, Lacerta agilis,*
	N45 17.483 E24 14.968 757 m	*Salamandra salamandra, Bufo bufo, Podarcis muralis,*
	N45 16.930 E24 12.962 818 m	*Salamandra salamandra, Lacerta agilis*
	N45 17.063 E24 13.865 711 m	*Salamandra salamandra, Bufo bufo*
	N45 17.484 E24 15.087 767 m	*Bufo bufo, Podarcis muralis*
	N45 17.559 E24 14.785 737 m	*Lacerta agilis*
Păuşa Valley	N45 16.127 E24 19.894 335 m	*Rana dalmatina, Zamenis longissimus*
	N45 16.841 E24 20.100 409 m	*Salamandra salamandra, Bufo bufo, Rana dalmatina, Rana temporaria, Lacerta agilis*
	N45 17.291 E24 20.021 490 m	*Salamandra salamandra, Rana temporaria*
Stânişoara Monastery	N45 18.098 E24 20.371 736 m	*Bufo/Bufotes* sp., *Lacerta viridis, Natrix natrix*
	N45 18.007 E24 20.543 718 m	*Lacerta viridis, Podarcis muralis*
	N45 18.012 E24 20.440 737 m	*Salamandra salamandra, Lacerta viridis*
	N45 18.013 E24 20.363 748 m	*Bufotes viridis, Podarcis muralis*
	N45 18.108 E24 20.215 706 m	*Natrix natrix*
Căciulata Valley	N45 15.478 E24 18.689 377 m	*Bufo bufo*
Olt Valley	N45 22.424 E24 18.042 314 m	*Bombina variegata, Salamandra salamandra, Pelophylax ridibundus, ridibunda, P. muralis*
	N45 20.516 E24 16.834 307 m	*Bombina variegata, Pelophylax ridibundus*
	N45 21.670 E24 17.564 331 m	*Lacerta viridis*
Turnu basin/ monastery	N45 17.341 E24 18.169 308 m	*Lacerta viridis, Zamenis longissimus*
	N45 17.608 E24 17.742 307 m	*Zamenis longissimus*
	N45 17.236 E24 18.338 320 m	*Hyla arborea, Pelophylax ridibundus, Natrix natrix, Natrix tesselata,*
	N45 17.233 E24 18.338 316 m	*Coronella austriaca*
Lotrişor (Căpăţânii)	N45 23.597 E24 16.376 440 m	*Salamandra salamandra, Bombina variegata,*
	N45 24.069 E24 14.940 507 m	*Bufo bufo*
	N45 23.839 E24 15.548 424 m	*Bufo bufo, Rana temporaria, Natrix natrix,*
	N45 22.561 E24 17.754 341 m	*Zamenis longissimus*
Băiaşu Valley	N45 22.164 E24 20.841 357 m	*Triturus vulgaris, Rana temporaria, Pelophylax ridibundus, Pelophylax* kl. *esculentus, Lacerta viridis, Lacerta agilis, Darevskia* (*praticola*) *pontica, Podarcis muralis, Natrix natrix*
	N45 22.200 E24 21.575 417 m	*Bufo bufo, Rana temporaria, Podarcis muralis,*
	N45 23.118 E24 18.085 329 m	*Natrix tessellata*

Table 1. (continued)

Locality	GPS coordinates and altitude	Species found
Pripoare-Dăngeşti	N45 19.577 E24 25.394 627 m	*Triturus vulgaris, Bufo bufo Rana temporaria, Pelophylax ridibundus, Pelophylax lessonae,*
	N45 18.365 E24 25.106 675 m	*Pelophylax ridibundus, Natrix natrix*
	N45 18.604 E24 25.400 702 m	*Rana dalmatina*
	N45 19.212 E24 25.489 719 m	*Pelophylax ridibundus*
	N45 19.484 E24 25.389 694 m	*Salamandra salamandra, Pelophylax* kl. *esculentus, Natrix natrix,*
	N45 20.269 E24 25.128 611 m	*Bufo bufo, Pelophylax lessonae, Pelophylax* kl. *esculentus,*
	N45 20.442 E24 24.996 597 m	*Lacerta agilis,*
	N45 20.605 E24 25.104 591 m	*Pelophylax* kl. *esculentus, Lacerta viridis*
	N45 18.956 E24 25.398 727 m	*Triturus vulgaris, Triturus cristatus*
	N45 18.495 E24 25.370 664 m	*Triturus cristatus, T vulgaris, Bufo viridis, Rana dalmatina, Pelophylax lessonae, Emys orbicularis*
	N45 19.892 E24 25.377 660 m	*Triturus cristatus, Bufo bufo*
	N45 21.324 E24 24.664 577 m	*Pelophylax ridibundus*
	N45 21.611 E24 24.624 533 m	*Pelophylax sp., Rana dalmatina*
Păteşti (Sălătruc) Valley	N45 16.936 E24 23.039 553 m	*Rana dalmatina, Pelophylax ridibundus*
	N45 17.005 E24 22.922 553 m	*Rana dalmatina, Lacerta viridis, Natrix natrix,*
	N45 17.555 E24 22.506 645 m	*Lacerta agilis,*
	N45 16.340 E24 22.932 509 m	*Lacerta viridis*
Lotrişor (Cozia)	N45 22.242 E24 18.527 373 m	*Darevskia (praticola) pontica, Podarcis muralis*
	N45 21.821 E24 19.079 418 m	*Lacerta agilis*
	N45 17.607 E24 14.883 730 m	*Lacerta agilis*
	N45 22.365 E24 18.255 367 m	*Lacerta viridis*
	N45 21.707 E24 19.168 425 m	*Darevskia praticola, Podarcis muralis*
Cozia Peak/ Chalet	N45 19.051 E24 20.508 1574 m	*Lacerta agilis, Zootoca vivipara*
Doabra Valley	N45 20.939 E24 14.638 330 m	*Bombina variegata*
	N45 21.002 E24 14.617 337 m	*Salamandra salamandra, Lacerta viridis, Podarcis muralis, Natrix natrix*
	N45 20.768 E24 14.594 345 m	*Bufo bufo*
	N45 21.156 E24 14.615 369 m	*Lacerta viridis, Podarcis muralis*
Vasilatu Valley	N45 21.096 E24 12.628 358 m	*Podarcis muralis*
	N45 22.568 E24 12.570 421 m	*Pelophylax ridibundus, Podarcis muralis,*
	N45 21.308 E24 12.571 366 m	*Salamandra salamandra, Podarcis muralis*
	N45 22.783 E24 12.555 440 m	*Lacerta viridis, Podarcis muralis, Anguis fragilis*
Lotru Valley at and below Brezoi	N45 20.158 E24 16.343 322 m	*Pelophylax ridibundus, Lacerta viridis*
	N45 20.233 E24 16.125 319 m	*Lacerta viridis*
	N45 20.213 E24 15.820 331 m	*Pelophylax ridibundus, Podarcis muralis, Lacerta viridis*
	N45 20.214 E24 15.591 339 m	*Lacerta viridis*

Figure 5. *Pelophylax* kl. *esculentus*, Pripoare-Dăngești, photo Al. Iftime.

We have recorded again the species *Bufotes viridis* and *Emys orbicularis*, which were known from "older" literature but not encountered during our previous work (Iftime & Iftime 2006, 2007). Both are also confined to the Cozia Massif. The extension of our investigation to the uppermost montane areas of the Cozia Massif has allowed us to find here *Zootoca vivipara*, a species which was not recorded by any previous technical publications[1].

Conversely, there are also species that we did not find during these investigations, including *Rana arvalis*[2] and any *Vipera* species (however, a recent record of

1 It is, however, mentioned (as *Lacerta vivipara*) alongside other amphibian and reptile species, some present in this area (e.g. *Salamandra salamandra*, *Bombina variegata*, *Lacerta viridis*, *Vipera ammodytes*), some never recorded in technically published scientific reports – e.g. *Triturus* (= *Ichthyosaura*) *alpestris*, on the Cozia National Park website (https://cozia.ro/fauna.html); we consider this a non-technical mention, now confirmed.

2 Sas et al. (2008) have doubted our record from 2007, but their justification for this is not valid: "… the authors mentioned reptile species (e.g. *Vipera ammodytes*) whose presence excludes the presence of the moor frog" – Sas et al. (2008), p. 57; however, *Rana arvalis* and *Vipera ammodytes* can and do coexist quite close to one another, as they do in various European areas, such as in Austria or Slovenia, see, e.g., Sillero et al. (2014), or even in Romania, see Ghira et al. (2002). Sas el al. (2008) also say that "neither the identification method used by the authors nor the attached photographs can be consid-

Figure 6. *Emys orbicularis*, Pripoare-Dăngești, photo O. Iftime.

V. ammodytes was kindly provided by Dr. Cristina Constantinescu). As for *Rana arvalis*, its previously found population was minute and might have already disappeared, as its location was much disturbed in the meanwhile; however, the examples of *Bufotes viridis* and *Emys orbicularis* illustrate that (meta)populations may persist despite not being scientifically recorded, sometimes for many years. Viper species are still present, as their habitat is ample and relatively not disturbed; their absence in our new data may be a product of their low detectability and/or stochastic factors.

Pelophylax lessonae is another species that we have recorded previously in Cozia, and which was not found any more in the location of that first record (which was the same as that of *Rana arvalis*); however, both *P. lessonae* and *P.* kl. *esculentus* were found alongside *P. ridibundus* in new localities. The metapopulational dynamic that we have noted for *Bombina variegata* (Iftime & Iftime 2017) – e.g. frequent relocation of breeding populations in new waterbodies when others disappear for natural

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ered convincing" (p. 57), without, however, elaborating why. While critical appraising of records is a welcome exercise, one must also keep in mind that the observation of live specimens, including their song (Iftime & Iftime 2007, p. 260), is more informative than photographs can be; also, by applying the criteria of Snell (2013) to our 2007 image, our first identification was supported. See also Speybroeck et al. (2016) to similar effect.

Figure 7. *Lacerta agilis* f. *erythronotus*, Lotrișor (Narâțu), photo O. Iftime.

Figure 8. *Darevskia* (*praticola*) *pontica*, Băiașului valley, photo Al. Iftime.

Table 2. Species records in publications along time

Species	Literature anterior to our studies: Fuhn (1960), Fuhn & Vancea (1961), Berbece (1968), Cogălniceanu et al. (2000), Ploaie (2004)	Our previous studies: Iftime & Iftime (2006, 2007, 2017)	Subsequent publications: Zinenko et al. (2010); Cogălniceanu et al. (2013a, b)	This study
Salamandra salamandra (Fig. 1)	+	+	+	+
Triturus cristatus	+	+	+	+
Lissotriton vulgaris	+	+	+	+
Bombina variegata	+	+	+	Not applicable
Pelobates fuscus	+	-	+ (as old records)	-
Bufo bufo	+	+	+	+
Bufotes viridis (Fig. 2)	+	-	+ (as old records)	+
Hyla (*arborea*) *orientalis*	+	+	+	+
Rana dalmatina	+	+	+	+
Rana temporaria	+	+	+	+
Rana arvalis	-	+	-	-
Pelophylax ridibundus (Fig. 3)	+	+	+	+
Pelophylax lessonae (Fig. 4)	-	+	+	+
Pelophylax kl. *esculentus* (Fig. 5)	-	+	+	+
Emys orbicularis (Fig. 6)	+	-	+ (as old records)	+
Lacerta agilis (Fig. 7)	+	+	-	+
Lacerta viridis	+	+	+	+
Podarcis muralis	+	+	+	+
Darevskia (*praticola*) *pontica* (Fig. 8)	-	+	-	+
Zootoca vivipara (Fig. 9)	-	-	-	+
Anguis (*fragilis*) *colchica*	+	+	+ (as old records)	+
Zamenis longissimus (Fig. 10)	+	+	-	+
Coronella austriaca	-	+	-	+
Natrix natrix	+	+	+ (as old records)	+
Natrix tessellata	-	+	+	+
Vipera berus	+	-	+	-
Vipera ammodytes	+	+	+	+

Figure 9. *Zootoca vivipara*, Cozia chalet/peak, photo O. Iftime.

Figure 10. *Zamenis longissimus*, Turnu basin/monastery, photo Al. Iftime.

or anthopogenic reasons – applies to most amphibian species in this area, and for the same reasons.

We conclude by pointing that the herpetofauna of the Cozia National Park is diverse, albeit massifs west of the Olt River (Narâțu and Căpățânii) appear to lack several of the species found across the river, in the Cozia Massif. However, this should not be interpreted as an absolute indication of absence; more research may prove their presence west of the Olt as well. We expect these data to be useful for the conservation-oriented management of the local population of amphibian and reptile species within the context of the Cozia National Park and Natura 2000 site.

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